

Chapter 22

Promising Practices for Supporting Adolescents' Online Literacy Development

Julie Coiro

GUIDING QUESTIONS

1. What are some ways that literacy instruction might differ as readers move from the printed page to learning on the Internet?
2. What are some of the biggest challenges that adolescents face as they turn to the Internet for academic information?
3. How might the use of online information and communication technologies in your classroom challenge your thinking about how adolescents learn to be proficient readers and writers?

Having the ability to comprehend and to create online information texts will play a central role in our students' success in a digital information age. Although some characterize the use of the Internet for learning as aspects of information literacy (American Library Association, 2003), technology use (International Society for Technology in Education, 2007) or life skills required for the 21st century (Partnership for 21st Century Skills, 2007), this chapter conceptualizes the use of the Internet as a reading issue. More specifically, *online reading comprehension*, or *online literacy*, in this chapter, is defined as a complex, problem-based inquiry process that involves a changing set of skills, strategies, and dispositions needed to ask important questions, then to locate, evaluate, synthesize, and communicate information to answer those questions using the Internet (Leu, Kinzer, Coiro, & Cammack, 2004).

Unfortunately, few studies have framed the use of the Internet as a reading issue, and even fewer have formally investigated how students acquire these online literacies or which classroom practices most effectively foster their development (see Castek, in process; Kuiper, 2007; Leu et al., 2007; New Literacies Research Team, 2005). To date, much of the literature has been either theoretical in nature, arguing that real differences exist between online and offline reading (e.g., Coiro, 2003, 2007a; Coiro & Dobler, 2007; Spires & Estes, 2002), or it has focused on how individuals interact with information on the Internet, illustrating that many students struggle with online informational reading tasks (see Bilal, 2001; Coiro, 2007b; Eagleton & Dobler, 2007).

Studies comparing online and offline reading comprehension indicate that the cognitive skills and strategies students use to read and learn effectively from online informational text are both similar to and more complex than what previous research suggests is required to comprehend offline informational text. On the one hand, observational and interview data (Coiro & Dobler, 2004, 2007; Schmar-Dobler, 2003) have revealed that skilled adolescents who read on the Internet often apply many of the same comprehension strategies used by strategic readers of printed offline texts (see Pearson, Roehrer, Dole, & Duffy, 1992). These strategies include activating prior knowledge, making inferences, monitoring and repairing comprehension, asking questions, and determining important ideas.

However, findings from these same studies and a growing collection of other research suggest that offline reading strategies are no longer sufficient to read effectively and learn from Internet text (e.g., see Afflerbach & Cho, 2008; Burbules & Callister, 2000; Leu, 2007; RAND Reading Study Group, 2002; Wolfe, 2001). Coiro and Dobler (2007), for example, found that in addition to more conventional reading comprehension strategies, successful Internet reading experiences require new applications of prior knowledge, inferential reasoning, and comprehension monitoring. Similarly, Schmar-Dobler (2003) reported that skilled online readers are aware of different textual features that aid their navigation through digital environments. More recently, Coiro (2007a) found that among 118 economically and academically diverse seventh graders, offline and online reading comprehension skills made significant and *independent* contributions to performance on a series of three online reading tasks. These data suggest that new (or at least statistically unique) reading comprehension skills and strategies may be required to comprehend and use informational text on the Internet.

Studies that have examined how students interact with information on the Internet report that many adolescents are less than proficient in their ability to complete online informational reading tasks successfully (Eagleton & Dobler, 2007; Goldman & Lawless, 2007; Leu et al., 2007). Often, students mistake their ability to move around on the Internet as the ability to read and comprehend online information (Burke, 2002). Equally discouraging are emerging reports that even some traditionally higher-performing offline

readers have difficulty adapting their use of offline comprehension strategies to online reading tasks. Several studies (Bilal, 2000, 2001; Coiro, 2007a; Kuiper, 2007; Leu, Zawilinski, Castek, et al., 2008; Wallace, Kupperman, Krajcik, & Soloway, 2000) have revealed cases of proficient offline readers who were unable to navigate hypertext efficiently, critically evaluate the relevancy and reliability of online information, and/or flexibly monitor and adapt their strategy use to changing online reading environments. Thus, we can no longer assume that higher-performing offline readers will succeed in online reading environments.

In addition to these two areas of work, some research has begun to investigate how learning in middle and high school classrooms is facilitated through the use of information and communication technologies, including the Internet. This chapter seeks to translate the preliminary patterns emerging from the literature in a first attempt to inform instruction that prepares students to succeed in a globally networked, online world of information. In these early stages, research in this area often characterizes instructional programs as "innovative" rather than "effective" (see, e.g., Kozma, 2003) because the field has not readily developed ways to evaluate learning success with new technologies (Sherry, Jesse, & Billig, 2002). Consequently, readers should proceed with caution, understanding that recommended guidelines and related promising practices in this chapter reflect the preliminary nature of research findings in this area. With this limitation in mind, a review of the literature suggests that at least five instructional guidelines show promise for fostering adolescents' online literacy development:

- *Guideline 1:* The effective online literacy teacher understands and makes explicit for students relationships between offline and online reading comprehension strategy use.
- *Guideline 2:* The effective online literacy teacher honors the literacies that students bring to school from their daily lives.
- *Guideline 3:* The effective online literacy teacher explores and clarifies expectations about new classroom roles and relationships embedded in problem-based online collaborations.
- *Guideline 4:* The effective online literacy teacher provides time for students to develop positive dispositions toward learning and communicating on the Internet.
- *Guideline 5:* The effective online literacy teacher uses self-, peer-, and teacher assessments as inquiry to inform reading strategy use and classroom instruction.

In the sections that follow, I examine each guideline in turn, presenting an evidence base and associated promising practices to guide instruction and future research.

Guideline 1: Understand and Make Explicit for Students the Relationships between Offline and Online Reading Comprehension Strategy Use

To date, empirical intervention studies (Castek, in process; Kuiper, 2007; Leu et al., 2005, 2007) and several international reviews of innovative practices of information and communication technology (ICT) use (e.g., Becta, 2007; Harrison, 2005; International Association for the Evaluation of Educational Achievement, 2000; Organisation for Economic Co-operation and Development, 2001) have documented characteristics of instructional programs that appear to positively influence adolescents' development of online literacy skills and strategies. Across these studies, at least two conclusions are pertinent to this chapter. First, explicit strategy instruction that emphasizes reflective dialogue and the flexible use of offline and online comprehension skills often yields gains in online reading comprehension ability and content-area learning for a diverse range of students in grades 5–12. Second, although many other contextual variables influence student learning outcomes, more effective programs of strategy instruction provide modeling of *when* and *how* to use particular reading strategies during collaborative, inquiry-based online learning tasks embedded in content-area instruction. Importantly, however, one study (Kuiper, 2007) found that 10 weeks of instruction was not enough to help fifth graders consistently apply their new repertoire of comprehension strategies in a follow-up series of similar online reading tasks.

In many ways, these recent findings about how best to develop online reading comprehension reflect what we already know about effective strategy instruction that facilitates offline reading comprehension (e.g., Duke & Pearson, 2002; Paris, Cross, & Lipson, 1984; Pressley, 2000): (1) Explicit instruction in how, when, and why to coordinate multiple strategies in a particular context, and (2) multiple opportunities for guided and independent practice and feedback lead to the acquisition and use of self-regulated reading comprehension strategies. With these research-based findings in mind, three classroom practices show promise toward teaching students about the relationships between offline and online reading comprehension strategy use.

- *Encourage students to compare offline and online text features and the reading purposes they engender.* As noted by Patterson (2000), we need to help our students think reflectively about the different features and purposes of reading and writing hypertext. Online texts have several unique characteristics that set them apart from traditionally printed offline texts (Afflerbach & Cho, 2008; Alexander & Jetton, 2000; Wolfe, 2001). Online readers, for example, may encounter at least a dozen additional cueing systems (e.g., navigational buttons, digitized speech, interactive supports) and informational text structures beyond the three conventional cueing systems (syntactic, graphophonic, and semantic cues) that skilled readers apply to comprehend printed text

(Eagleton & Dobler, 2007). Compared to printed texts, some Internet texts also prompt new purposes for reading, more critical thought processes during reading, and new examples of authentic responses after reading (Coiro, 2003).

Several lessons designed by classroom teachers for the ReadWriteThink online lesson database (www.readwritethink.org) effectively illustrate reflective classroom assignments that prompt students to notice the similarities and differences between offline and online texts, and their associated range of reading purposes. Beyersdorfer (2007), Karchmer (2007), and Seitz (2006), for example, provide excellent models of how adolescents might compare and contrast offline and online text features (e.g., graphics, hyperlinked headings, digitized speech, and video) to gain a deeper understanding of how to navigate and to comprehend information on the Internet.

Other lessons help students address the challenge of where to focus their attention online (Lankshear & Knobel, 2002), with strategy discussions about how to skim and scan effectively while searching for specific online information (see Kolodziej, 2007a, 2007b). Some of these lessons include self-assessment forms that ask students to summarize how and when each skill might be most useful. Another online lesson (Mozambite, 2005) incorporates an interactive program that invites upper-level elementary school students to explore a range of informational texts (including websites) and identifies suitable reading purposes and audiences for each.

Teachers can adapt any of these lessons to develop similar activities using printed texts and websites that are more consistent with their grade level or unit of study. Over time, strategy lessons that compare and contrast offline and online texts can help students recognize, label, and define a range of more and less familiar online cueing systems and related reading purposes. In turn, students can begin to actively consider new strategies for effectively comprehending and using the range of informational texts they encounter on the Internet.

- *Provide explicit teacher and peer think-aloud models of effective online reading comprehension strategy use.* For some students, online metacognitive strategy use may not be improved without explicit training in how to search for and interact with information on the Internet (Castek, in process; Tsai & Tsai, 2003). One solution is for teachers to provide explicit think-aloud models of effective online reading strategy use. A *think-aloud* is a technique in which the teacher pauses while reading to verbally model the thought processes of a skilled reader as he or she interacts with a text (Davey, 1983). Teachers use think-aloud models to call attention to often overlooked or hidden comprehension strategies that are useful in particular reading situations. Highly focused and well-planned, strategy think-alouds can provide readers of all ages a common language for sharing important metacognitive strategies that facilitate comprehension (Kelly & Clausen-Grace, 2007; Wilhelm, 2001).

Guided by an emerging taxonomy of online reading comprehension strategies that adolescents use to solve online information tasks (see Leu et al., 2007), teachers can develop instructional think-alouds to model how to formulate online questions effectively; to generate effective search terms; to evaluate critically the relevancy, reliability, and stance of website information; to integrate information from multiple resources; and to use one or more online communication tools to share a response with others (see also Coiro, 2005a; Eagleton & Dobler, 2007). Figure 22.1, for example, provides a model of how a teacher might think out loud to explain how to preview a website for relevant information.

Several researchers also suggest inviting students to construct their own think-aloud models of comprehension strategy use as they read on the Internet

Teacher: (*Arrives at a website.*) First, I'm going to read the title of the page and the title of the website in the bar at the top of the window. This gives me an idea of what the whole website might be about. I might also look at the first part of the website address or the "About this site" button here in the corner to see what I can learn about who created the information at this website. Then, I'm going to scan over the menu choices that run down the left side of the screen. This helps me understand what topics might be covered at this website. I can also try to visualize how big this website is and how much information it covers.

Student: Okay, so let's just click on the third link to see what's there.

Teacher: Well, I'm not going to click yet. I'll just scroll my mouse over each choice while I think about the information I might find behind that link. This is kind of like making predictions as you read a story, but here it's with information rather than narrative text. See how I also try to hold my mouse over each choice without clicking? That's because sometimes another menu or graphic will pop up to give me even more choices for where to read next. See—oh, there's one of those pop-up menus right there that was hidden before! Now, I am going to think about my question and pick the link that will most likely lead me closer to information that I need.

Student: (*Scans the menu list.*) I don't see any words that match the words I am looking for in the left menu. I think we should just go back and try a different site.

Teacher: We could do that, but I see a word that means something similar to my question, even though it doesn't match the words exactly. I am going to click on this link first to see if it leads me a little closer to information about my topic. (*Clicks and scans the page.*) Yes, see here, the name of the hyperlink didn't match exactly, but because it was about a similar topic, I clicked on it and now I see my topic listed as one of the links to another page that will help me answer my question. So sometimes looking for synonyms or broader categories about your topic can help you find relevant information several levels from the homepage of the website.

FIGURE 22.1. Excerpt from a teacher think-aloud for previewing a website for relevant information.

(Damico & Baidon, 2007; Dwyer, 2007; Kymes, 2005). Thinking aloud about their own reading of offline texts serves to enhance students' comprehension-monitoring abilities (Baumann & Jones, 1993) and improve overall reading competence (Rosenshine & Meister, 1994). In addition, helping adolescents to see themselves as online experts with important skills can encourage even weaker offline readers to take leadership roles in classroom strategy discussions (Leu, Coiro, Castek, et al., 2008; New Literacies Research Team, 2005).

Exploratory work in this area indicates that teacher and peer think-aloud models can be shared by a whole class with a projector and one common text, by a small group of students as part of an Internet workshop session, where students share and compare information they discovered online (see Leu, Leu, & Coiro, 2004); or by a sequence of guided lessons, during which teachers gradually transfer to students most of the responsibility for modeling online reading comprehension strategies. (You can read more about this sequence of lessons, called *Internet reciprocal teaching*, in Leu, Coiro, Castek, et al., 2008). In each situation, insights gleaned from both effective and ineffective strategy use can inform future lessons and highlight online reading experts (teachers and students) to whom others can turn for additional support.

- *Embed explicit strategy lessons within curriculum-based, online information challenges.* As noted by Guthrie, Wigfield, and Perencevich (2004), students are motivated by authentic and intentional reading purposes that are situated in the context of interesting texts. In addition, students are more likely to transfer what they learn from strategy instruction to new informational texts when it is embedded within inquiry activities with content-specific goals (Guthrie & Cox, 2001). Strategy instruction that is embedded within themed units about science or health, for example, has been documented to build conceptual knowledge, while promoting strategic reading comprehension in both offline (Guthrie et al., 2004) and online information environments (Castek, in process; Kuiper, 2007; New Literacies Research Team, 2005).

These findings highlight the potential of using what might be called "curriculum-based online information challenges" to link strategy instruction with authentic, content-specific issues and interesting online texts. Rather than teaching online reading strategies as part of an isolated technology lesson with the computer teacher, a curriculum-based online information challenge invites students to use a range of Internet technologies to locate and interact with online informational texts linked directly to a particular content theme or learning objective (see Leu, Coiro, Castek, et al., 2008). Small groups of students are presented with content-related information problems designed both to develop conceptual knowledge and elicit important online reading comprehension skills (e.g., asking questions, locating, evaluating, synthesizing, and communicating). Introductory challenges may ask students in a middle school U.S. History course, for instance, to incorporate only two or three of these procedures (e.g., locate, evaluate relevance, communicate) to solve a problem: (1) Locate the name of one American who might be considered a

hero of the Civil War and provide an explanation of what makes that person a hero; (2) send your partner an e-mail with the name you located, evidence from the text that supports your opinion, and the address of the website(s) where you found the information.

More complicated challenges may require students in a high school science class, for example, to incorporate several online reading strategies to solve a more controversial (or complex) problem:

1. What is the main cause of global warming?
2. Find another answer to this same question.
3. Which answer do you think is most accurate and how did you determine that it was?
4. Post your answers on our classroom blog.

Students in either challenge are guided to discuss their solutions in small groups, while they exchange reading comprehension strategies for locating, critically evaluating, and synthesizing online information. Lessons are designed to minimize teacher talk, maximize student engagement, and provide time at the end for students to debrief and to exchange strategies with the entire class, after having already done so in their small groups (for more information, see Leu, Coiro, Castek, et al., 2008).

Guideline 2: Honor the Literacies Students Bring to School from Their Daily Lives

Youth play a key role in establishing the emerging nature of Internet-related practices and texts (Livingstone, 2002). As of 2005, some 93% of teens in the United States used the Internet (Lenhart & Madden, 2005). Of those online teens, nearly 40% knew how to use the Internet to create and share digital stories and videos; 28% had created their own blog or online journal; 27% maintained their own personal webpage; and 27% knew how to remix content they found online into their own creations.

Unfortunately, many schools fail to acknowledge the online information and communication literacies that adolescents bring to classrooms from their daily lives (e.g., Alvermann, Jonas, Steele, & Washington, 2006; Levin & Arafeh, 2002). To many educators, the creative and social literacy practices that often take place outside school classrooms are unrelated to values associated with more privileged informational or print-based literacies inside school classrooms (Burnett & Wilkinson, 2005; Lankshear & Knobel, 2003). Furthermore, out-of-school online practices, and their associated texts, are often perceived as immoral or deviant (Moje & van Helden, 2004) and literacy progress is difficult to measure in ways to which teachers are accustomed in an era of accountability (Tierney, Bond, & Bresler, 2006).

Yet, as Selfe and Hawisher (2004) point out: "If literacy educators continue to define literacy in terms of alphabetic practices only, in ways that ignore, exclude, or devalue new-media texts, they ... run the risk of their curriculum no longer holding relevance for students who are communicating in increasingly expansive networked environments" (p. 233). Consequently, we need new frameworks and associated instructional models that bridge in-school and out-of-school practices to exploit the multiple literacy competencies that adolescents bring to school (Hull & Schultz, 2002; O'Brien & Bauer, 2005). So what can teachers do to ensure that instruction in online reading comprehension is relevant and meaningful to adolescents who are technologically savvy in their daily literacy practices? Three classroom practices show particular promise in this area.

- *Foster a classroom culture that recognizes the multiple literacy contributions of every student.* Although many adolescents have difficulty navigating school-based online reading tasks, these same students bring with them different literacy experiences that have shaped their identities as social and literate individuals outside the classroom (Alvermann et al., 2006; Anstey & Bull, 2006). Perry (2006) refers to these different literacy experiences that students practice at home and/or during their own personal time as the *hidden literacies* that often go unnoticed by teachers, without a focused effort to learn about them (see also Voss, 1996). Perry (2006) explains that when hidden literacies are given a place in the school curriculum, they may actually enhance student learning and serve as springboards to authentic academic literacies required for inquiry and deep understanding.

Consequently, it is important that teachers foster a classroom culture that welcomes variation and capitalizes on the unique literacy talents that each student offers to the classroom learning community (Cope & Kalantzis, 2000). Teachers should make time to learn about what students are reading and writing outside of school, and make space for students to demonstrate their knowledge of digital literacies, linking to students' identities as competent learners. Time might be provided weekly during class for adolescents to share texts they have constructed, for example, while writing fan fiction (e.g., www.fanfiction.net), remixing photos (e.g., worth1000.com) or moving images (e.g., www.animemusicvideos.org/home/home.php); creating three-dimensional virtual worlds (e.g., www.alice.org); maintaining a personal website (e.g., www.angelfire.com/egomrtastee18/index.html) or online magazine (www.agirlsworld.com); or composing graphic novels that integrate manga (Japanese comics) and anime (Japanese animation) (e.g., www.koyagi.com/Libguide.html).

By learning more about adolescents' online literacy experiences outside the classroom, teachers are better equipped to connect to the ways students use literacies to construct meaning and pursue their own interests (Alvermann et al., 2006). In addition, opportunities to perceive themselves as literacy experts, with important skills to share, encourage students' greater investment in classroom activities, increase their engagement with texts

and, in some cases, improve their self-confidence and motivation in school (Brader, 2008; New Literacies Research Team, 2005; Schulz-Zander, Buchter, & Dalmer, 2002).

- *Help students connect and compare effective literacy strategies for engaging in personal and academic online reading tasks.* In her work with developing online readers, Kuiper (2007) found that adolescents tended to overestimate their abilities to construct academic knowledge based on their abilities to engage in out-of-school literacy practices. She also found the way the Internet is used at school often does not fit in with students' likes and dislikes about particular topics, websites, and tasks (see also Stone, 2006). Consequently, Kuiper explains, although it is important to recognize and encourage use of the texts and practices from students' daily lives, teachers should not overestimate adolescents' ability to engage in higher-level academic inquiry tasks without explicit support (see also Hinostroza, Guzman, & Isaacs, 2002; Tsai & Tsai, 2003). This support should clearly explain the differences between students' use of information and communication technologies for topics and purposes of their own choice, and their use of the Internet to achieve academic research goals.

Adolescents are often quite savvy, for example, in navigating chatrooms and online role-playing games (Chandler-Olcott & Mahar, 2003); varying their language and voice when composing instant messages for different audiences and purposes (Lewis & Fabos, 2005); producing creative e-zines to share with their peers (Guzzetti & Gamboa, 2004); and "multimediating" across a range of online texts and technologies (Beach & O'Brien, 2008). However, as stated earlier, adolescents often lack the skills necessary for school-related online information tasks. Thus, effective online literacy teachers can help by anticipating the connectedness between academic expectations and students' personal experiences with Internet technologies to predict aspects of online reading (e.g., discrepancies, new functions, or purposes) that may frustrate students or conflict with their use of the Internet (Kuiper, 2007). Then, students can sometimes be given opportunities to choose their own topics and/or texts, while they receive explicit and reflective strategy instruction in how to comprehend, critically interpret, and respond to each type of text for different purposes and audiences.

Emerging research highlights the potential of connecting personal and academic online reading tasks to facilitate conventional learning outcomes, new literacies, and student engagement (e.g., O'Brien, Beach, & Scharber, 2007; Perry, 2006; Tierney et al., 2006). Over time, students begin to understand how to use literacy differently for different purposes, in and out of school, and realize the need to apply these skills and strategies flexibly for new purposes and new contexts using new technologies. In turn, instruction that explicitly links effective strategies for engaging in personal and academic online reading tasks may prompt a more connected and relevant classroom culture for today's youth—a culture in which "students explore, challenge,

test, and critique knowledge in ways that make sense for themselves in their own lived experience" (Hunsberger, 2007, p. 422).

- *Provide space for students to explore, interpret, and create multiple forms and genres of texts.* Moje (2007) has proposed that adolescents prefer multimodal texts that blend print information with visual, audio, spoken, and other non-verbal forms of expression. Research (Beach & O'Brien, 2008) suggests that adolescents also tend to spend a large part of their personal lives multitasking or, more appropriately, *multimediating* between instant messaging conversations, social networking sites, online video games, and online-popular culture texts (e.g., fanfiction, Japanese anime). Consequently, Tierney et al. (2006) propose that teachers who want to support adolescents' new literacy development in the classroom should provide opportunities for students to interact with "images, soundtracks, and text interconnected in very complex, multifaceted ways using a plethora of image, sounds, and print" (p. 361). They argue that including reflective interactions with multimodal texts as part of collaborative school projects can prompt more sophisticated uses of these texts.

A number of researchers have documented the potential of encouraging students to explore, interpret, and create multiple forms and genres of texts as part of the classroom curriculum. Burn and Leach (2004), for example, summarized findings from 12 case studies and reported that the incorporation of moving image media in the curriculum led to gains in print literacy and also prompted students' developing identities as learners capable of determining their own meanings from text. Hobbs and Frost (2003) reported that 11th graders who received extensive instruction in how to analyze critically a combination of print, audio texts, and visual texts improved in their ability to identify the purpose, target audience, point of view, and construction techniques of media messages compared to a control group that received no media analysis instruction.

Elsewhere, Chandler-Olcott and Mahar (2003) found that opportunities to create multimodal texts had positive benefits for students, who came to see themselves as capable text producers, especially when such texts were constructed for an audience of peers, as well as for teachers. In addition, O'Brien et al. (2007) reported preliminary findings that some reluctant adolescent readers who participate in a combination of traditional reading assignments and novels and media-rich digital projects not only made gains in conventional reading and writing skills but also developed a stronger self-image as readers and writers. Overall, these findings reinforce Moje's (2007) conclusion that classroom settings that "provide the freedom to explore multiple forms and genres of text for expressing identity and representing understanding ... may engender the motivation necessary to push so-called struggling readers" (p. 210) toward the higher levels of thinking required to comprehend online texts across a range of personal and academic purposes.

Guideline 3: Explore and Clarify Expectations for New Classroom Roles and Relationships Embedded in Problem-Based Online Collaborations

This guideline is prompted by research suggesting that innovative uses of the Internet for collaborative inquiry prompt new classroom literacy learning opportunities and new relationships among teachers, students, and peers (Erstad, 2002; Schulz-Zander et al., 2002). Students and teachers who are more accustomed to didactic approaches may have difficulty negotiating the multiple roles and responsibilities that accompany collaborative problem-based uses of the Internet in school classrooms (Mioduser, Nachmias, Tubin, & Forkosh-Baruch, 2002). Because literacy contexts change so quickly on the Internet (Leu, Kinzer, et al., 2004), teachers should continue to be flexible in exploring and clarifying what they expect of themselves and of their students as they negotiate changing roles and relationships for student-student and teacher-student collaborations. Below, new characteristics of each type of relationship are paired with emergent findings about how best to create a classroom culture that exploits the full potential of online, problem-based collaborations to support adolescents' online literacy development.

- *Clarify new student roles and relationships for collaborating with peers.* For teachers who design online classroom literacy collaborations, it is important to clarify for students how to interact effectively with others in an online, collaborative learning community. When working in face-to-face partnerships with their peers, students should understand two issues in particular. First, students should come to appreciate that each of their peers brings to the group a different, but valuable, set of skills and experiences (Cope & Kalantzis, 2002). Thus, any preconceived notions about a classmate's ability (or inability) to contribute to online collaborations based on his or her offline reading performance may hinder the group's overall ability to solve complex problems with the Internet. Rather, teachers help students understand that the most effective online collaborative groups appreciate individual differences, determine each student's strengths for the particular task at hand, then distribute responsibilities to exploit these strengths (Schulz-Zander et al., 2002).

Second, students should understand the new affective literacy roles and responsibilities for which they will be held accountable in an online collaborative learning community. Drawing from recent frameworks (see American Association for School Librarians, 2007; International Society for Technology in Education, 2007; Partnership for 21st Century Skills, 2007), today's online literacy learners are expected to be self-determined, critical, and reflective. In addition to learning new information, they should know how to use the Internet to seek divergent perspectives, make ethical decisions, and to contribute actively to the exchange of ideas and new knowledge construction. Moreover,

online learners are expected to display creativity, initiative, persistence, and confidence as they work collaboratively with new technologies to solve real problems. Law, Lee, and Chow (2002) suggest that affective and sociocognitive learner outcomes may be even more important than "knowledge-based competencies" in preparing students for lifelong learning in the 21st century. Consequently, teachers should clearly communicate these expectations to students as part of literacy instruction.

In addition to face-to-face peer relationships, online collaborations may also invite students to work with adolescents from different countries or different backgrounds (e.g., cultural, linguistic, geographic, or economic). In these situations, students are expected to be aware of and appreciate different perspectives as they initiate and/or respond to online exchanges. Here teachers play an important role in making sure students go beyond surface-level discussions about their similarities and differences to truly understand the complex contexts in which online collaborations take place (for further discussion, see Fabos & Young, 1999). The most meaningful cross-cultural conversations "extend cultural exploration beyond tourism or the fascination with the 'other' to help students understand economic, political, social, and imperialistic pressures on different world populations" (Fabos & Young, 1999, p. 238).

Preliminary studies of classrooms in which teachers clarified and supported new online collaborative roles and peer relationships during inquiry-based projects reported increases in students' interest and acquisition of academic content, as well as cultural competence, self-esteem, and motivation in school (Erstad, 2002; Harrison, 2005; Hinsotroza et al., 2002; Schulz-Zander et al., 2002). O'Brien et al. (2007) found that both high- and low-performing students seemed to do better in new literacy environments, where "collaborative social allegiances" (p. 68) attracted and engaged even those students who were disenchanted with traditional instructional literacy programs (see also Erstad, 2002; New Literacies Research Team, 2005).

- *Clarify new roles and relationships between students and teachers.* Consistent with a new literacies perspective of online reading comprehension (Leu, Kinzer, et al., 2004), teachers become more important, though their roles change, in new literacies classrooms. It is not just the online technologies themselves, but characteristics of the classroom learning culture, and the design of student-centered learning contexts within which they are situated, that appear to matter most (Casteck, in process; Law et al., 2002; Mioduser et al., 2002). Consequently, teachers should be aware of their own roles and changing relationships with students as they introduce online literacy collaborations into the curriculum.

In these new contexts, successful teachers perceive their role as designer and orchestrator of authentic online projects to initially minimize the complexities of online problem-based inquiry (Kuiper, 2007; Schulz-Zander et al., 2002). In addition, effective online literacy teachers stimulate knowledge construction over an extended period of time (as opposed to just a few les-

sons), with tasks inspired by students' questions and personal interests about a topic or issue (Erstad, 2002; Law et al., 2002). A critical role for teachers is to outline and to make explicit for students several intermediate steps in the online research process (Law et al., 2002). These steps may include, for example, stopping to elicit feedback from peers that informs group members' efforts to refine their questions, revise preliminary survey questions, or edit their finished projects. Pausing like this at each phase of research ensures opportunities for students to work with others throughout the process rather than only at the end, and increases the interdependence of students' work (Law et al., 2002).

As teachers explore how to plan and orchestrate these complex online learning tasks, they must also consider how best to negotiate more equalized relationships with students. Schulz-Zander and colleagues (2002) noted that in several innovative learning environments a distinguishing feature was that "the students' self-activity increased while the teacher moved further to the background" (p. 441) to give structure to learning activities, scaffold the students' work processes, and reflect on student progress. Others recommend that teachers provide authentic opportunities for students to join them as literacy leaders and technology experts, while they explore the changes taking place in literacy and learning on the Internet (Erstad, 2002). For instance, teachers recognized for their successful integration of technology into their literacy curricula are not afraid to ask their students for help in using a particular tool, and they often make space for students to teach online literacy skills to each other (see Coiro, 2005a). Elsewhere, technology-savvy students can work as partners with teachers to support their use of technology in classrooms (see, e.g., the Generation YES [Youth and Educators Succeeding] program described by Harper, 2006). Ten years of data collected by the Northwest Regional Educational Laboratory (NWREL) show that Generation YES (www.genyes.com) is "an effective alternative for schools wishing to integrate technology into their regular curriculum and increase their use of project-based, student-centered learning practices" (Harper, 2006, p. 3). Overall, a careful combination of explicit instruction and efforts to make space for students to share and collaborate with peers and teachers appears to have contributed to or hindered the success of most online collaborative projects (Law et al., 2002; Mioduser et al., 2002; Schulz-Zander et al., 2002).

Guideline 4: Provide Time for Students to Develop Positive Dispositions toward Learning and Communicating with the Internet

Positive *dispositions*, or attitudes and beliefs, are key dimensions of effective learning (Guthrie et al., 2004), particularly for students growing up in a digital information age (Carr & Claxton, 2002; Johnston, 2005). In the context of challenging *offline* reading comprehension tasks, affective variables, such as

attributions of success and failure, self-judgments, and self-efficacy beliefs, are positively related to strategy use and self-regulation (Schunk & Zimmerman, 2003). Skilled offline readers are often characterized as curious, engaged learners who are confident in their ability to tackle difficult texts (Guthrie et al., 2004). Learners with positive dispositions often seek out challenging reading tasks, and each successful experience reinforces their initiation and use of the comprehension skills and strategies applied.

Similarly, as learners transition into *online* reading environments, their attitudes and self-efficacy relative to the Internet appear to be important factors that affect their motivation, interests, and performance in Internet-based learning environments (Peng, Tsai, & Wu, 2006; Tsai, 2004; Tsai & Lin, 2004). Moreover, some of the motivational factors that influence students' success on the Internet appear to be significantly unique compared to reading dispositions that are useful in offline learning environments (Terry & Doolittle, 2006; Whipp & Chiarelli, 2004).

In open-ended Internet reading environments, successful online readers are those who manage rapidly changing text forms with persistence, flexibility, patience, critical stance, and self-reflection (see Bilal, 2000, 2001; Eagleton, 2003; Eagleton, Guinee, & Langlais, 2003; Kuiper, 2007). Others highlight the importance of affective dispositions, such as creativity (Loveless, 2002) and cognitive flexibility (Anderson, 2002; Coiro & Dobler, 2007), to construct meaning successfully from disparate online texts.

Notably, Tsai and Tsai (2003) reported that college students with high Internet self-efficacy had better information search strategies and learned better than those with low Internet self-efficacy in a web-based learning task. They observed behavioral, procedural, and metacognitive differences between two groups of college freshman with higher and lower levels of Internet self-efficacy. More specifically, they found that students with higher Internet self-efficacy tended to (1) use computers more correctly and efficiently; (2) be more willing than peers with lower self-efficacy to try new search approaches when a previous strategy had not worked; (3) solve problems independently rather than asking for help; (4) read more purposefully to select necessary information; and (5) be more apt to criticize and question information they encountered on the Internet.

Unfortunately, little research has closely examined how classroom teachers can help to develop positive student dispositions toward reading and learning with the Internet. However, related work in how to develop student positive reading dispositions in print reading environments suggests that at least two practices may similarly facilitate important dispositions required for comprehending information on the Internet.

- *Attend to personal reading dispositions as part of a framework for online reading comprehension strategy instruction.* As noted by Schoenbach, Greenleaf, Cziko, and Hurwitz (2000), students' self-awareness and personal reading identity are critical dimensions of classroom life that support adolescents'

reading development. Recent findings highlight the potential of attending to personal reading dispositions as part of a framework for offline reading comprehension strategy instruction. Guided by the notion that efforts to promote self-efficacy beliefs should support self-regulated reading, Souvignier and Mokhesgerami (2006) designed three different reading interventions that complemented strategy knowledge with varying levels of cognitive and motivational aspects of self-regulation. The researchers then examined the effects of each intervention on the comprehension levels of three groups of fifth graders across 20 classrooms. Overall, they found that classroom instruction emphasizing both "cognitive and motivational self-regulatory competence" (p. 58) produced significant and long-term gains in fifth graders' reading comprehension, understanding of reading comprehension strategies, and competence for application of reading strategies compared to a control group. In addition, although there was no direct evidence of separate gains in self-efficacy, Souvignier and Mokhesgerami believed that "promoting motivational aspects of self-regulation was realized by integrating motivational and cognitive principles" (p. 69).

Other programs that combined affective and cognitive aspects of strategy instruction to promote students' engagement and offline reading comprehension achievement across the curriculum reported significant changes in students' attitudes and behaviors related to reading (Greenleaf, Schoenbach, Cziko, & Mueller, 2001; Guthrie & Davis, 2003). In these programs, teachers supported personal reading dispositions by embedding regular routines and opportunities for conversations about reader habits, attitudes, and personal reading goals into their content-area curricula: "Classroom activities support individual students in developing increased awareness of themselves as readers, inviting them to discover and refine their own goals and motivations, likes and dislikes, and hopes and potential growth in relationship to reading" (Schoenbach et al., 2000, p. 27).

Moreover, the focus on student effort, rather than on ability, may prompt high self-efficacy beliefs that may support positive dispositions toward reading and learning (Souvignier & Mokhesgerami, 2006). Thus, as individual students gain a sense of themselves and their efforts as readers, they should be encouraged to understand how their habits and attitudes influence their ability to comprehend challenging texts. Over time, teachers can facilitate strategy conversations that integrate the focus on personal dimensions with social, cognitive, and knowledge-building dimensions of classroom life to support students as they work to make sense of texts.

Given the success of these programs in promoting students' positive dispositions toward offline reading and learning, we now need research that examines how these interventions play out as adolescents face the challenges of reading and learning on the Internet. As we journey forward, students ought to benefit from classroom discussions that integrate cognitive reading strategy use with the beliefs, attitudes, motivations, and habits that appear to characterize confident and capable online learners.

• *Design online inquiry projects that prompt interdisciplinary connections to 21st-century life skills to improve learning and motivation.* Current work indicates the need for interdisciplinary curricular connections that prompt students to look across multiple issues to solve the broader complex problems of the 21st century (Barton & Smith, 2000; Jackson & Davis, 2000). In 2007, the Partnership for 21st Century Skills revised its learning framework to recommend that classroom teachers “move beyond a focus on basic competency in core subjects to promote understanding of academic content at much higher levels by weaving 21st century interdisciplinary themes into core subjects” (paragraph 2). More specifically, the organization suggests that teachers design learning tasks that empower students to solve important problems by integrating their knowledge of several subject areas with emerging opportunities to apply their developing financial, global, and civic literacies in real academic learning contexts. Consequently, effective online literacy teachers seek to promote adolescents’ self-efficacy and online reading confidence, while providing authentic opportunities to practice entrepreneurial skills, to develop a mutual respect for diverse cultures and lifestyles, and to participate effectively in civic life experiences.

Models of how teachers are addressing the complexities of designing online interdisciplinary projects that integrate 21st century life skills have begun to emerge around the world. For example, distinguished educators associated with the Apple Learning Interchange (see Glaude et al., 2007) share details of their Inspire to Inquire project, which challenges adolescents to find interdisciplinary connections in their environments. Curtis (2004) describes school projects in Hawaii that integrate art, writing, and computer animation to work on real-world problems related to conservation and cultural heritage. And Pearlman (2007) outlines the fundamentals of technology-embedded interdisciplinary projects and reminds teachers to focus on developing online reading dispositions that include collaboration, critical thinking, problem solving, and citizenship. In addition, teachers may wish to explore online resources such as the Global Virtual Classroom (www.virtualclassroom.org), Global Education Collaborative (globaleducation.ning.com), and Global SchoolNet (globalschoolnet.org/index.cfm), which seek to foster international dialogue about new literacies and the sharing of resources among students and teachers around the world.

Guideline 5: Use Self-, Peer, and Teacher Assessments as Inquiry to Inform Online Reading Strategy Use and Classroom Instruction

This guideline is informed by work suggesting that assessment in a digital age should be framed as a process of inquiry, whereby students and teachers work together through observation, reflection, and feedback to understand their academic progress and document learning over time (Johnston,

1997; Serafini, 2000/2001). As we move into the next millennium, Tierney (2000) argues for a shift toward more learner-centered assessment practices that “afford students opportunities to engage with teachers, caregivers, and stakeholders in meaningful partnerships involving genuine decision making” (p. 244). Consequently, students learning how to read successfully on the Internet should have opportunities to engage in self-, peer, and teacher assessments of their online comprehension strategy use as part of a reflective learning process. By more actively participating in the assessment process, students begin to accept more responsibility for their learning and to reflect more thoughtfully on their literacy efforts and performance (Afflerbach, 2007; Chappuis & Chappuis, 2007/2008). From this perspective, three classroom practices guide our thinking about assessment as inquiry to inform online reading strategy use and classroom instruction.

• *Encourage students to reflect actively on their online reading strategy use during each phase of the inquiry process.* Successful online readers monitor and reflect on their abilities to generate questions effectively, and to locate, evaluate, synthesize, and communicate information as they interact with multiple texts in online reading environments (Coiro & Dobler, 2007; Kuiper, 2007). Reflection that takes place while students are engaged in the activity, and after completing it, promotes continuous learning in authentic contexts and is integral to the online inquiry process (Hughes, Bruce, & Edwards, 2006).

Notably, online readers often vary in their strategy use across the phases of an online reading task (Coiro, 2007a); that is, sometimes readers who can efficiently search, locate, and communicate where they found a text may have difficulty critically evaluating the information within that text or synthesizing information across multiple texts. Likewise, a reader who struggles to locate and communicate online texts using search engines, blogs, or e-mail may sometimes be able to critically evaluate and synthesize information when taken directly to the website(s). Thus, teachers should provide opportunities for students to reflect on their ability to use reading strategies aligned with each phase of online reading comprehension, and to integrate and coordinate strategies across the phases while using different online technologies.

One idea for creating opportunities for student and peer reflection of online reading strategy use is to use a software program such as Camtasia (see www.techsmith.com/camtasia.asp) or iShowU (see www.shinywhitebox.com/home/home.html). These programs create a video recording of an individual’s or a small group’s actions and voices as participants complete an online reading task, just as if you were watching over their shoulder. At the end of the task, teachers, students, and/or peers can replay the video recording, stopping to reflect on effective and ineffective reading comprehension strategy use during each step in the reading process. Viewers are able to pause, for example, at the end of each phase of an online reading task (e.g., after an online text has been located, but before it has been read more closely) and before or after certain reading decisions (e.g., text entry, mouse clicks, scrolling, scan-

ning text, pressing the back button) to explain their reasons for using particular strategies or to ask others for suggestions about what they might have done in a similar online reading situation. Through dialogue and discussion, students come to understand and internalize their own strengths and areas for online reading improvement.

- *Teach students how to set and monitor realistic online comprehension goals.* As stated earlier, adolescents often overestimate their abilities to read on the Internet and are easily frustrated when they realize their perceptions do not match their abilities (Kuiper, 2007). Once students begin reflecting on their use of effective online reading strategies to solve academic inquiry tasks, they should have opportunities to set realistic online comprehension goals as part of the learning process. Students who set and monitor their own reading goals are able to internalize and organize their reading strengths and difficulties (Johns & Lenski, 2001). In addition, the students are more determined to learn, and they feel a sense of accomplishment when they reach their goals (Afflerbach, 2007).

Checklist assessments are one effective way to help students determine their strengths and areas of improvement for a particular reading task (Afflerbach, Reutschlin, & Russell, 2007). Thus, teachers might consider adapting research-based checklists of effective online reading strategy use (see Eagleton & Dobler, 2007; Illinois Mathematics and Science Academy, 2007; Leu, Coiro, Castek, et al., 2008) to develop criteria for successful performance in a number of different online reading scenarios. Students can then refer to these checklists, while they are completing the comprehension task, and after they have finished, to monitor their current level of online reading comprehension ability. During reflective strategy discussions, teachers and peers can also provide feedback to students and help to set realistic goals for particular strategies on which to focus next. Over time, students may create learning portfolios (see Valencia, 2007) of recorded online reading sessions, paired with audio descriptions of their progress on specific learning targets, and develop insights into themselves as online readers and learners (Coiro, 2005b). These types of formative assessment practices enable students to more actively adjust and improve their own learning (Chappuis & Chappuis, 2007/2008) and more deeply understand effective online information use for learning (Hughes et al., 2006).

- *Employ multiple and alternative forms of assessment that evaluate online learning products and processes for both individuals and groups.* Another set of recommended practices for using assessment to inform instruction integrates three purposeful decisions about how to measure online reading comprehension ability. First, because the benefits of collaborative online inquiry tasks are rarely captured with traditional assessments (Harrison, 2005; Johnston, 2001), it is important to use *multiple* and *alternative* assessment instruments to measure comprehension strategy use and collaboration in online reading environments. Alternative assessments of online reading processes (e.g., Coiro,

2007a; Leu et al., 2005) can capture high levels of strategic processing not typically measured by multiple-choice measures of reading comprehension ability (see Johnston, 1983; Pearson & Hamm, 2005). Similarly, alternative measures of collaborative learning experiences can capture new 21st-century learning outcomes that may include "newfound respect for classmates and their opinions, understanding work team dynamics and using them for high-quality outcomes, taking turns, and recognizing the different learning that can occur in the collaborative and cooperative context" (Afflerbach, 2007, p. 170). Data from multiple assessment formats in technology-rich learning environments can then be triangulated to demonstrate learning outcomes that map onto state standards of academic achievement (Sherry et al., 2002).

Second, informative assessments of online reading comprehension ability should be designed to capture both the *processes* that occur during authentic online inquiry tasks and the resulting learning *products*. If effective reading assessments reflect our understanding of how students read in relation to a particular task, text, and setting (Afflerbach, 2007), effective online literacy teachers should create assessment situations that require students to use online reading comprehension strategies during real learning tasks, while providing new insights about how students effectively process online information and create final learning products. Likewise, effective online literacy teachers must be able to observe student behavior carefully and continually refine measures of performance-based processes and products to evaluate student work as it occurs in different online learning environments (Sherry et al., 2002).

Third, teachers should use informative assessments to capture both a student's *individual* online reading ability or contribution to an assigned online reading task and the quality of his or her working *group's* interactions and discussion. Johnston (2001) claims that the shift in our thinking about online literacy development as part of a social process prompts the need for assessments of group collaboration and productivity. Moreover, "the movement from individual assessment to group interaction and discussion provides for more active learning and allows [teachers to] assess students' growth [in strategy use] throughout the process" (Wood, Taylor, Drye, & Brigman, 2007, p. 196).

Concluding Comments

As we come to the end of this chapter, it is clear that teachers play a central, albeit somewhat different, role within new literacy classrooms. Learning how to foster adolescents' online literacy development most effectively is a complex and gradual process that requires innovation, reflection, and flexibility. Effective use of information and communication technologies in the classroom involves both knowing the technical aspects of how to operate continually emerging technologies and understanding how to use the technologies

to bring about higher-order thinking and collaboration (Harlen & Deakin Crick, 2003). Instead of being the single source for all literacy knowledge, the teacher's role becomes that of mediator supporting self-reflection and self-regulation in ways that enable adolescents to gain greater control over their own literacy practices with networked information technologies.

Because of these changing teacher roles, greater attention needs to be placed on teacher education and professional development in a digital information age. As the Internet continues to challenge conventional definitions of reading comprehension, we need more research that systematically examines how to define and measure the skills, strategies, and dispositions required for comprehending a wider, and continuously evolving, range of offline and online informational texts. Likewise, future studies that build on what we have learned about how adolescents spend their time outside of school would help teachers realize new possibilities for teaching and learning in school. And finally, we need a series of rigorous research studies, with more statistical analyses to determine the extent to which the five promising practices outlined in this chapter positively impact adolescents' online literacy and learning across a number of classroom settings. As we venture forward in these areas, the journey will no doubt be challenging. Yet it is a challenge that can no longer be ignored, if we, as educators and researchers, seek to prepare today's adolescents for their literacy futures in a globally networked, digital information world.

QUESTIONS FOR DISCUSSION

1. Observe students working together while reading on the Internet to complete a problem-based online reading task that you designed. What dispositions do students demonstrate as they interact with each other and the information? At what are students most successful, and what appears to be most challenging? Document your findings with specific anecdotes that occur during the activity. Share your results with colleagues, and outline a series of steps to facilitate more successful collaborative online learning experiences.
2. Select a comprehensive website that you find useful for students in a particular content area. Skim the website to look for challenges adolescents may face as they navigate the information. Create a teacher think-aloud that provides an explicit model of the literacy strategies you believe are most helpful for learning from the information at that website. Conduct your think-aloud with students, and write down your reflections on what worked and what did not. How would you modify what you did?
3. Describe three specific actions that you will initiate to learn about and validate the literacies that students bring to your classroom from their daily lives. As you follow through with these actions, keep a journal to reflect on the unique skills sets you discover among your students. Recruit a colleague to do the same, and take time to exchange your reflections over time. Summarize how the information from this shared experience can inspire adolescents to contribute more actively to classroom reading and writing activities.

Resources

Further Reading

- Coiro, J., Knobel, M., Lankshear, C., & Leu, D. J. (Eds.). (2008). *Handbook of research in new literacies*. Mahwah, NJ: Erlbaum.
- Eagleton, M. B., & Dobler, E. (2007). *Reading the Web: Strategies for Internet inquiry*. New York: Guilford Press.
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Websites

- www.readingonline.org—Reading Online, sponsored by the International Reading Association, offers hundreds of articles about reading education and classroom instruction. Many of the articles focus on instructional practices that facilitate adolescents' literacy and learning with the Internet.
- www.newliteracies.uconn.edu—The New Literacies Research Team at the University of Connecticut conducts research on the new reading comprehension and learning skills required by the Internet and other emerging information and communication technologies. Several projects mentioned in this chapter are described in more detail at this website.
- 21cif.imsa.edu—The 21st Century Information Fluency Project, affiliated with the Illinois Mathematics and Science Academy, seeks to support educators committed to mastering and teaching digital information fluency skills, including the ability to find, evaluate, and use digital information effectively, efficiently, and ethically.
- www.globalschoolnet.org/index.cfm—Global SchoolNet. This website for children and adolescents hosts collaborative projects and scholarship competitions about diplomacy and global issues. Projects are designed to develop literacy and communication skills, to foster teamwork, to create multicultural understanding, and to prepare youth for critical life skills required for success in an increasingly global economy.
- www.edutopia.org/index.php—Sponsored by the George Lucas Foundation, Edutopia documents and shares information about exemplary programs in K-12 public schools. Many of the featured programs promote adolescent literacy and content-area learning through classrooms projects with the Internet.

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